

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

OTTEVANGERS, S., U.
Vereenigde
Nieuwe Parklaan 97
NL-2587 BN The Hague
PAYS-BAS

Date of mailing (day/month/year) 04 August 2000 (04.08.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference P22496PC00	
International application No. PCT/NL99/00416	International filing date (day/month/year) 02 July 1999 (02.07.99)

1. The following indications appeared on record concerning:		
<input checked="" type="checkbox"/> the applicant	<input checked="" type="checkbox"/> the inventor	<input type="checkbox"/> the agent <input type="checkbox"/> the common representative
Name and Address MEIMA, Heine, Rolf Borgercompagnie 239 NL-9631 TJ Borgercompagnie Netherlands	State of Nationality NL	State of Residence NL
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:		
<input type="checkbox"/> the person	<input checked="" type="checkbox"/> the name	<input type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence
Name and Address MEIMA, Heine, Rolf Borgercompagnie 239 NL-9631 TJ Borgercompagnie Netherlands	State of Nationality NL	State of Residence NL
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
3. Further observations, if necessary:		
4. A copy of this notification has been sent to:		
<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned	
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned	
<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:	

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Simin Baharlou
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

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PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

OTTEVANGERS, S., U.
Vereenigde
Nieuwe Parklaan 97
NL-2587 BN The Hague
PAYS-BAS

Date of mailing (day/month/year) 25 April 2000 (25.04.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference P22496PC00	
International application No. PCT/NL99/00416	International filing date (day/month/year) 02 July 1999 (02.07.99)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address

OTTEVANGERS, S., U.
Vereenigde Octrooibureaux
Nieuwe Parklaan 97
NL-2587 BN The Hague
Netherlands

State of Nationality

State of Residence

Telephone No.

070 4166 711

Facsimile No.

070 4166 799

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☒ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address

OTTEVANGERS, S., U.
Vereenigde
Nieuwe Parklaan 97
NL-2587 BN The Hague
Netherlands

State of Nationality

State of Residence

Telephone No.

070 4166 711

Facsimile No.

070 4166 799

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Philippe Bécamel

Telephone No.: (41-22) 338.83.38

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TENT COOPERATION TRE Y

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 17 April 2000 (17.04.00)	Applicant's or agent's file reference P22496PC00
International application No. PCT/NL99/00416	Priority date (day/month/year) 02 July 1998 (02.07.98)
International filing date (day/month/year) 02 July 1999 (02.07.99)	
Applicant BUWALDA, Pieter, Lykle et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
28 January 2000 (28.01.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Nestor Santesso Telephone No.: (41-22) 338.83.38
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PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P22496PC00		FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/NL 99/ 00416	International filing date (day/month/year) 02/07/1999	(Earliest) Priority Date (day/month/year) 02/07/1998	
Applicant AVEBE B.A.			

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

SALT-STABLE MODIFIED STARCH

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☒ None of the figures.

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INTERNATIONAL SEARCH REPORT

International Application No

T/NL 99/00416

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23L1/0522 A23L1/187 A23L1/068 A23P1/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L A23P A23B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 192 576 A (CHANG SHAU-GAN ET AL) 9 March 1993 (1993-03-09) column 2, line 50 -column 3, line 65 example 4	1-4, 7, 9, 10, 19, 20
X	EP 0 796 868 A (NAT STARCH CHEM INVEST) 24 September 1997 (1997-09-24) cited in the application page 1, line 11 -page 2, line 55; claims examples	1-7, 9, 12, 13, 16, 17, 19, 20
X	WO 97 03573 A (SVERIGES STAERKELSEPRODUCENTER ; STAAHL AAKE (SE)) 6 February 1997 (1997-02-06) cited in the application the whole document	1-5, 19, 20
	-/--	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

5 October 1999

Date of mailing of the international search report

19/10/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Vuillamy, V

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INTERNATIONAL SEARCH REPORT

International Application No

T/NL 99/00416

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 751 410 A (CARACCI J ET AL) 7 August 1973 (1973-08-07) column 2, line 1 - line 17; claim 1 ----	1-4, 6, 7, 19, 20
X	US 4 973 447 A (SEIB PAUL A ET AL) 27 November 1990 (1990-11-27) column 2, line 10 - column 3, line 7 column 5, line 10 - line 24 ----	1, 2, 4, 6, 7, 16, 17, 19, 20
X	US 4 228 199 A (CHIU CHUNG W ET AL) 14 October 1980 (1980-10-14) column 2, line 56 column 5, paragraph 2 column 6, line 55 - line 23 example VIII column 6 ----	1, 2, 6, 8, 16, 19, 20
X	US 5 232 723 A (BISSEON JEAN-PIERRE ET AL) 3 August 1993 (1993-08-03) column 2, line 67 - column 3, line 14 examples 8, 15 ----	1, 2, 6, 9, 10, 16, 18-20
X	EP 0 354 262 A (FRISCO FINDUS AG) 14 February 1990 (1990-02-14) page 2, line 5 - line 37 page 3, line 2 - line 18 example E ----	1, 2, 9, 10, 16, 18-20
X	US 4 612 197 A (POSTNER HERMANN) 16 September 1986 (1986-09-16) column 2, line 59 - line 66 example 2 ----	1, 2, 6, 9-11, 19, 20
X	US 3 956 515 A (MOORE CARL O ET AL) 11 May 1976 (1976-05-11) column 3, line 62 - column 4, line 9 ----	1, 2, 7, 19, 20
X	PATENT ABSTRACTS OF JAPAN vol. 098, no. 011, 30 September 1998 (1998-09-30) & JP 10 146173 A (Q P CORP), 2 June 1998 (1998-06-02) abstract ----	1, 2, 14, 15, 19, 20
A	VRIES DE J A: "NIEUWE MOGELIJKHEDEN MET AMYLOPECTINE-AARDAPPELZETMEEL" VOEDINGSMIDDELEN TECHNOLOGIE, vol. 28, no. 23, November 1995 (1995-11), page 26/27 XP002063172 the whole document ----	

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INTERNATIONAL SEARCH REPORT

International Application No

CT/NL 99/00416

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	G.O. PHILLIPS: "Gums and Stabilisers for the Food Industry (5)" 1990 , IRL PRESS , GB XP002085102 Pages 57-62 tables I,II,III ----	
A	R.L. WHISTLER: "Starch: Chemistry and Technology (vol.II)" 1967 , ACADEMIC PRESS , USA XP002085103 Pages 163-189 the whole document ----	
A	M.HUCHETTE: "La Transformation de l'Amidon pour Usages Industriels at Alimentaires." ANN. FALS. EXP. CHIM., vol. 62, no. 687, 1969, pages 296-308, XP002085101 page 301, paragraph 2.3 -page 308 -----	

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

T/NL 99/00416

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5192576	A	09-03-1993	AU 656214 B	27-01-1995
			AU 2250492 A	03-05-1993
			CA 2080298 A	12-04-1993
			CA 2119133 A	15-04-1993
			EP 0607150 A	27-07-1994
			JP 7505520 T	22-06-1995
			WO 9306743 A	15-04-1993
EP 0796868	A	24-09-1997	AU 1644897 A	25-09-1997
			CA 2200768 A	22-09-1997
			JP 2893003 B	17-05-1999
			JP 10007842 A	13-01-1998
WO 9703573	A	06-02-1997	SE 504433 C	10-02-1997
			AU 6473296 A	18-02-1997
			CZ 9700803 A	16-07-1997
			EP 0806902 A	19-11-1997
			NO 971097 A	13-03-1997
			SE 9502628 A	18-01-1997
US 3751410	A	07-08-1973	NONE	
US 4973447	A	27-11-1990	NONE	
US 4228199	A	14-10-1980	NONE	
US 5232723	A	03-08-1993	AU 640444 B	26-08-1993
			AU 6981691 A	15-08-1991
			CA 2035547 A	10-08-1991
			DE 69106733 D	02-03-1995
			DE 69106733 T	08-06-1995
			DK 442361 T	22-05-1995
			EP 0442361 A	21-08-1991
			ES 2067058 T	16-03-1995
			FI 910361 A	10-08-1991
			JP 2804852 B	30-09-1998
			JP 4211343 A	03-08-1992
			NO 301514 B	10-11-1997
			PT 96692 A,B	29-11-1991
EP 0354262	A	14-02-1990	AT 81750 T	15-11-1992
			AT 84399 T	15-01-1993
			AU 624403 B	11-06-1992
			AU 3930889 A	15-02-1990
			CA 1335547 A	16-05-1995
			EP 0355472 A	28-02-1990
			FI 893769 A,B,	12-02-1990
			MX 170533 B	30-08-1993
			PT 91424 A,B	08-03-1990
			US 5158794 A	27-10-1992
US 4612197	A	16-09-1986	DE 3423699 C	16-01-1986
			AT 58459 T	15-12-1990
			CA 1233693 A	08-03-1988
			EP 0166284 A	02-01-1986
			ES 544556 A	01-08-1986
			PT 80711 A,B	01-07-1985

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/NL 99/00416

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3956515	A	11-05-1976	CA 1017617 A	20-09-1977
JP 10146173	A	02-06-1998	NONE	

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PATENT COOPERATION TREATY

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITYstand vapp
PCT ok

To:

OTTEVANGERS, S.U.
VEREENIGDE OCTROOIBUREAUX

Nieuwe Parklaan 97

2587 BN Den Haag

PAYS-BAS

21 SEP. 2000

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

NRF2 2-1-2001

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aan

Applicant's agent's file reference

P22496PC00

Date of mailing
(day/month/year)

18.09.2000

IMPORTANT NOTIFICATION

International application No.
PCT/NL99/00416International filing date (day/month/year)
02/07/1999Priority date (day/month/year)
02/07/1998

Applicant

COÖPERATIEVE VERKOOP- EN PRODUCTIEVEREN... et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Tantum, P

Tel. +49 89 2399-8143



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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P22496PC00		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/NL99/00416	International filing date (day/month/year) 02/07/1999	Priority date (day/month/year) 02/07/1998	
International Patent Classification (IPC) or national classification and IPC A23L1/0522			
Applicant COÖPERATIEVE VERKOOP- EN PRODUCTIEVEREN... et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 28/01/2000	Date of completion of this report 18.09.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Smeets, D Telephone No. +49 89 2399 7492 

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL99/00416

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-25 as originally filed

Claims, No.:

1-20 as originally filed

Drawings, sheets:

1/3-3/3 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL99/00416

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims
	No: Claims 1-20
Inventive step (IS)	Yes: Claims
	No: Claims 1-20
Industrial applicability (IA)	Yes: Claims 1-20
	No: Claims

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/NL99/00416

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: US-A-5 192 576 (CHANG SHAU-GAN ET AL) 9 March 1993 (1993-03-09)
- D2: EP-A-0 796 868 (NAT STARCH CHEM INVEST) 24 September 1997 (1997-09-24) cited in the application
- D3: WO 97 03573 A (SVERIGES STAERKELSEPRODUCENTER ;STAAHL AAKE (SE)) 6 February 1997 (1997-02-06) cited in the application
- D4: US-A-4 228 199 (CHIU CHUNG W ET AL) 14 October 1980 (1980-10-14)
- D5: US-A-5 232 723 (BISSON JEAN-PIERRE ET AL) 3 August 1993 (1993-08-03)
- D6: EP-A-0 354 262 (FRISCO FINDUS AG) 14 February 1990 (1990-02-14)
- D7: US-A-4 612 197 (POSTNER HERMANN) 16 September 1986 (1986-09-16)
- D8: US-A-3 956 515 (MOORE CARL O ET AL) 11 May 1976 (1976-05-11)
- D9: PATENT ABSTRACTS OF JAPAN vol. 098, no. 011, 30 September 1998 (1998-09-30) & JP 10 146173 A (Q P CORP), 2 June 1998 (1998-06-02)
- D10: VRIES DE J A: 'NIEUWE MOGELIJKHEDEN MET AMYLOPECTINE-AARDAPPELZETMEEL' VOEDINGSMIDDELEN TECHNOLOGIE, vol. 28, no. 23, November 1995 (1995-11), page 26/27 XP002063172

Novelty - Art.33(1) and (2)PCT

The subject-matter of claim 1 lacks novelty in the light of D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10 since all documents disclose a method for improving a foodstuff by adding starch.

This claim discloses no further essential features since "salt-stable" is not a feature but a technical effect of the modified starch (see also **Re Item VIII**).

It could be argued that the modified starch of the present invention has a superior salt-stability when compared to other starch products, but claim 1 does not contain the features, necessary to clearly define this property. Consequently, said claim lacks novelty in view of D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10.

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/NL99/00416

In addition, the following remarks on the term "salt-stable" are made:

The description of the present application mentions a superior salt-stability, even at low viscosity (p.6, line 32).

The effect of salt on a thick-thin starch is mentioned in D1. This starch produces a paste with a high viscosity before retort and a low viscosity after retort (column 1, lines 6-7). This document discloses also that this starch works in salt and no-salt environments, before and after retort. (column 5 and 6, example 4). This implies that said starch is salt-stable, even at low viscosity.

D8 (column 4, lines 2-9) discloses a starch, having significantly improved starch batter properties in the presence of salts.

In addition, D10 mentions a method for improving a foodstuff by adding waxy potato starch. This document discloses also that said starch has an increased stability towards salts. The high stability is important if the starch is used in long-life soups and sauces.

Dependent claims 2-20 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty, the reasons being as follows:

- Claims 2 and 3 lack novelty in the light of D2 (p.2, lines 12-13 and 58-89 and p.3, lines 1-3) and D10, since both documents disclose the essential features of said claims.
- Claims 4 and 5 lack novelty in the light of D3 (p.5 line 5) and D10, since both documents disclose starch derived from a genetically modified potato.
- Claims 6 and 7 lack novelty in the light of D2, since a stabilised, cross-linked starch is disclosed in said document (p.5, example 3).
- The subject-matter of claim 8 is not new in the light of D4, since this document discloses a cold-water dispersible, modified potato starch with gelling properties (column 13, line 14).
- Claims 9 and 10 lack novelty in the light of D2, since this document discloses a dressing formulation which comprises modified starch and 1.7 (w/w) % of salt (p.10 and 11, example 9).

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/NL99/00416

- The subject-matter of claim 11 is not new in the light of D7, since this document discloses a sauce enhancer composition comprising sodium glutamate in a concentration of 5% by weight and a starch (column 4, example 2 and column 5, line 14).
- Claims 12 and 13 lack novelty in the light of D2 since this document discloses a retorted cheese sauce composition which comprises modified starch and at least 1 (w/w) % of casein (p.14, example 16).
- Claims 14 and 15 lack novelty in the light of D9, since this document discloses an example of a fish egg-like food comprising a modified starch and 1% calcium chloride.
- Claims 16 and 17 are not new in the light of D4, since a lemon pie filling composition is disclosed which comprises modified starch and 26 (w/w)% of sugar (=sucrose) (column 12, example VIII).
- The subject-matter of Claim 18 is not new in the light of D5 and D6. D5 discloses a marinade, comprising starch (column 10, line 57). D6 discloses a marination or pickling medium which contains modified starch (p.2, line 11).
- Claims 19 and 20 are is not new since a modified starch and the foodstuff obtainable by adding this modified starch are disclosed in D2 (p.14, line 36 and 56).

Re Item VII

Certain defects in the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D4, D5, D6, D7, D8, D9 and D10 are not mentioned in the description, nor are these documents identified therein.

Re Item VIII

Certain observations on the international application

Claim 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features necessary for achieving this result should be added.

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INTERNATIONAL PRELIMINARY

International application No. PCT/NL99/00416

EXAMINATION REPORT - SEPARATE SHEET

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P22496PC00	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/NL99/00416	International filing date (day/month/year) 02/07/1999	Priority date (day/month/year) 02/07/1998
International Patent Classification (IPC) or national classification and IPC A23L1/0522		
Applicant COÖPERATIEVE VERKOOP- EN PRODUCTIEVEREN... et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 28/01/2000	Date of completion of this report 18.09.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Smeets, D Telephone No. +49 89 2399 7492



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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL99/00416

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-25 as originally filed

Claims, No.:

1-20 as originally filed

Drawings, sheets:

1/3-3/3 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL99/00416

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims
	No: Claims 1-20
Inventive step (IS)	Yes: Claims
	No: Claims 1-20
Industrial applicability (IA)	Yes: Claims 1-20
	No: Claims

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/NL99/00416

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: US-A-5 192 576 (CHANG SHAU-GAN ET AL) 9 March 1993 (1993-03-09)
- D2: EP-A-0 796 868 (NAT STARCH CHEM INVEST) 24 September 1997 (1997-09-24) cited in the application
- D3: WO 97 03573 A (SVERIGES STAERKELSEPRODUCENTER ;STAAHL AAKE (SE)) 6 February 1997 (1997-02-06) cited in the application
- D4: US-A-4 228 199 (CHIU CHUNG W ET AL) 14 October 1980 (1980-10-14)
- D5: US-A-5 232 723 (BISSON JEAN-PIERRE ET AL) 3 August 1993 (1993-08-03)
- D6: EP-A-0 354 262 (FRISCO FINDUS AG) 14 February 1990 (1990-02-14)
- D7: US-A-4 612 197 (POSTNER HERMANN) 16 September 1986 (1986-09-16)
- D8: US-A-3 956 515 (MOORE CARL O ET AL) 11 May 1976 (1976-05-11)
- D9: PATENT ABSTRACTS OF JAPAN vol. 098, no. 011, 30 September 1998 (1998-09-30) & JP 10 146173 A (Q P CORP), 2 June 1998 (1998-06-02)
- D10: VRIES DE J A: 'NIEUWE MOGELIJKHEDEN MET AMYLOPECTINE-AARDAPPELZETMEEL' VOEDINGSMIDDELEN TECHNOLOGIE, vol. 28, no. 23, November 1995 (1995-11), page 26/27 XP002063172

Novelty - Art.33(1) and (2)PCT

The subject-matter of claim 1 lacks novelty in the light of D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10 since all documents disclose a method for improving a foodstuff by adding starch.

This claim discloses no further essential features since "salt-stable" is not a feature but a technical effect of the modified starch (see also **Re Item VIII**).

It could be argued that the modified starch of the present invention has a superior salt-stability when compared to other starch products, but claim 1 does not contain the features, necessary to clearly define this property. Consequently, said claim lacks novelty in view of D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10.

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In addition, the following remarks on the term "salt-stable" are made:

The description of the present application mentions a superior salt-stability, even at low viscosity (p.6, line 32).

The effect of salt on a thick-thin starch is mentioned in D1. This starch produces a paste with a high viscosity before retort and a low viscosity after retort (column 1, lines 6-7). This document discloses also that this starch works in salt and no-salt environments, before and after retort. (column 5 and 6, example 4). This implies that said starch is salt-stable, even at low viscosity.

D8 (column 4, lines 2-9) discloses a starch, having significantly improved starch batter properties in the presence of salts.

In addition, D10 mentions a method for improving a foodstuff by adding waxy potato starch. This document discloses also that said starch has an increased stability towards salts. The high stability is important if the starch is used in long-life soups and sauces.

Dependent claims 2-20 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty, the reasons being as follows:

- Claims 2 and 3 lack novelty in the light of D2 (p.2, lines 12-13 and 58-89 and p.3, lines 1-3) and D10, since both documents disclose the essential features of said claims.
- Claims 4 and 5 lack novelty in the light of D3 (p.5 line 5) and D10, since both documents disclose starch derived from a genetically modified potato.
- Claims 6 and 7 lack novelty in the light of D2, since a stabilised, cross-linked starch is disclosed in said document (p.5, example 3).
- The subject-matter of claim 8 is not new in the light of D4, since this document discloses a cold-water dispersible, modified potato starch with gelling properties (column 13, line 14).
- Claims 9 and 10 lack novelty in the light of D2, since this document discloses a dressing formulation which comprises modified starch and 1.7 (w/w) % of salt (p.10 and 11, example 9).

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- The subject-matter of claim 11 is not new in the light of D7, since this document discloses a sauce enhancer composition comprising sodium glutamate in a concentration of 5% by weight and a starch (column 4, example 2 and column 5, line 14).
- Claims 12 and 13 lack novelty in the light of D2 since this document discloses a retorted cheese sauce composition which comprises modified starch and at least 1 (w/w) % of casein (p.14, example 16).
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Certain defects in the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D4, D5, D6, D7, D8, D9 and D10 are not mentioned in the description, nor are these documents identified therein.

Re Item VIII

Certain observations on the international application

Claim 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features necessary for achieving this result should be added.

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/NL99/00416

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FAX 22 740 1435

Uw ref. PCT/NL99/00416
Onze ref. p22496PC00

Den Haag,
June 22, 2000

Re.: International patent application No. PCT/NL99/00416
in the name of Cooperatieve Verkoop en Productie ...

Dear Sirs ,

I herewith request under Rule 92 bis the change of the name
of the applicant/inventor of

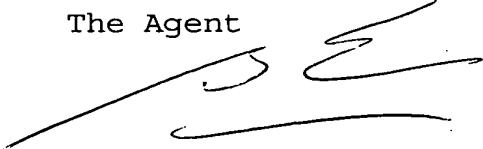
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Please send us form PCT/IB/306 as soon as possible.

The Agent


M. J. Hatzmann

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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : A23L 1/0522, 1/187, 1/068, A23P 1/16	A1	(11) International Publication Number: WO 00/01251 (43) International Publication Date: 13 January 2000 (13.01.00)
(21) International Application Number: PCT/NL99/00416 (22) International Filing Date: 2 July 1999 (02.07.99) (30) Priority Data: 98202232.9 2 July 1998 (02.07.98) EP (71) Applicant (for all designated States except US): COÖPERATIEVE VERKOOP- EN PRODUCTIEVERENIGING VAN AARDAPPELMEEL EN DERIVATEN AVEBE B.A. [NL/NL]; Beneden Oosterdiep 27, NL-9641 JA Veendam (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): BUWALDA, Pieter, Lykle [NL/NL]; Mondriaanstraat 32, NL-9718 MJ Groningen (NL). MEIMA, Heine, Rolf [NL/NL]; Borgercompagnie 239, NL-9631 TJ Borgercompagnie (NL). BRINE, Charles, James [US/US]; 28 Tee-ar Place, Princeton, NJ 08540 (US). (74) Agent: OTTEVANGERS, S., U.; Vereenigde Octrooibureaux, Nieuwe Parklaan 97, NL-2587 BN The Hague (NL).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: SALT-STABLE MODIFIED STARCH (57) Abstract The invention relates to starch used in the food-industry. The invention provides modified starch, and derivatives derived thereof, having improved salt-stability (salt-stable starch), use of such modified starch or derivatives derived from said starch in foodstuff, a method for providing salt-stability to foodstuff comprising use of such modified starch or derivatives derived from said starch and foodstuff comprising said modified starch or derivatives derived from said starch.		

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Title: SALT-STABLE MODIFIED STARCH

The invention relates to starch used in the food-industry.

Foodstuff is often thickened by the inclusion of a certain amount of starch as binder, filling or thickening agent, for example providing viscosity to a foodstuff during automated filling (canning).

For example, when industrially autoclaving or sterilising a food-stuff containing solid pieces, a certain filling viscosity is required while a container is being filled to prevent splashing of the liquid content over the rim of the container. Also, said viscosity provides an equal distribution of said solids during the filling phase. In canning, after filling, a decrease of viscosity is required, and any residual viscosity of the foodstuff after filling is considered unwanted for many applications. However, viscosity of starches in general is reduced during or after prolonged heat treatment, said reduction is in general aggravated by the presence of salts in the foodstuff.

Yet another reason to thicken a foodstuff is to provide said food with a better flavour, texture (mouthfeel) and appearance (looks).

Starch in itself has some flavour, that in general is appreciated by a customer, provided the foodstuff does not comprise too much starch which makes it taste starchy or cereal-like and provided a sensation of well-cooked starch is present, as opposed to an "undercooked" starch which gives a raw sensation. Most flavour in food, however, derives from (intricate combinations of) salts, proteins, short peptides, amino acids, fatty acids and salts thereof, sugars, short and medium chain alcohols, and so on.

Texture of a starch comprising food is very much dependent on the degree of viscosity attained by adding varying degrees of starch. Aspects such as smoothness, firmness, cohesiveness, density, thickness, wateriness,

cutability or spreadability, chewability and others can all depend on the viscosity and water retention properties provided by a starch. Too much cohesiveness is in general not appreciated, customers often prefer a more creamy, smooth texture. The choice of type of starch for use in foodstuff is greatly influenced by properties such as the stability during baking, deep-freezing, thawing and storage. It must furthermore be remembered that in general too much starch, although providing a desired viscosity, may change the flavour of the food negatively, in general there is a need to reduce starch dosage whenever this is made possible.

Appearance of a starch comprising foodstuff relates among others to the aspects mentioned with texture, however, starches often add opacity or cloudiness to food, making it look less palatable.

The above illustrates that, within the food industry, use of starch, for each and every different application, often comprises finding the right balance between too little and too much, in trying to find a product with attractive palatability.

A distinct problem herein is the fact that starches in themselves have reduced stability to the effects of certain salts, ions or electrolytes present in food. For example, a starch may initially provide a desired texture (such as smoothness, firmness, cohesiveness, density, thickness, wateriness, cutability or spreadability, chewability) to a foodstuff, which then, however, loses said texture, cohesiveness or smoothness in time because the salt-stability of the starch used is too low or inappropriate. The product becomes watery, falls apart and separates into wet and less wet fractions, leaks flavours, in general loses its appearance and texture, and loses its attraction to a customer. Said loss of texture or appearance is in general caused by a too low stability to salt.

ts, electrolytes, cations or anions, or other constituents of food, and necessitates increasing the starch dosage, often with detrimental effects on taste.

5 The effects of salts on starch have been investigated for more than a century (see for examples: Starch: Chemistry and Technology. Eds. Whistler and Paschall, Academic Press, New York and London).

10 The gelatinization of starch and starch derivatives in the presence of medium to high concentrations of electrolytes has been studied extensively (B.J. Oosten, Die Staerke 31, 228-230 (1979); B.J. Oosten, Die Staerke 32, 272-275 (1980); B.J. Oosten, Die Staerke 34, 233-239 (1982); B.J. Oosten, Die Staerke 35, 160-169 (1983); B.J. Oosten, Die Staerke 42, 327-330 (1990)). In low concentration systems the properties
15 of solutions of polymers in the presence of electrolytes can be adequately accounted for by electrostatics, taking into account only the magnitude of the ionic charge, the concentration and the solvent. Biological systems are usually more concentrated and specific ion-solvent effects will
20 dominate the solution properties

Some electrolytes promote gelatinization and some electrolytes inhibit the process. Promotion or inhibition mainly follow the well known Hofmeister or lyotropic series (F. Franks in "Water", Royal Society of Chemistry Paperbacks
25 London-1983).. This series are a listing of the order in which they affect polymer (and therefor starch) solubility. An example of such a series is:

30 $\text{CNS}^- > \text{ClO}_4^- > \text{I}^- > \text{NO}_3^- > \text{Cl}^- > \text{F}^- > \text{HPO}_3^{2-} > \text{SO}_4^{2-}$

Electrolytes on the left (CNS^- , ClO_4^- , I^- , NO_3^-) promote and on the right (Cl^- , F^- , HPO_3^{2-} , SO_4^{2-}) inhibit gelatinisation.

This series can of course be extended with other anions and similar series can be listed for cations, although in
35 general the effects observed for cations are smaller than for

anions. A completely satisfying explanation for the observed phenomena for this series has not been reported so far, but the general believe is that electrolytes on the right side enhance water structure thus favouring solvent-solvent interactions over starch-solvent interactions (Franks 1983). This induces a hampered gelatinisation and lack of stability of starches in water.

Neutral components, such as hydrocolloids, ureum, sorbitol, caseine, and sugars such as sucrose, fructose, galactose, and others have similar effects on the stability of starch as salts. It has for example been found that neutral components like saccharides (sugars) effect the viscosity of strach and derivatives (I.D. Evans, D.R. Haisman, Die Staerke 34, 224-231 (1982)). The effects have been contributed to the same phenomena as seen with salts, notably the effects reported on water structure are similar.

The application of starch derivatives in food systems is usually accompanied by the addition of electrolytes, mainly chlorides and phosphates. Especially chlorides and phosphates inhibit the development or stability of viscosity of starch and starch derivatives.

A special case is the addition of calcium ions to potato starch and potato starch derivatives. Potato starch contains bound monophosphate ester groups. In water these phosphate groups give the starch backbone negative charge resulting in a high viscosity as compared to other starches. When calcium ions are added they form a relatively insoluble complex with the phosphate groups resulting in a sharp decrease in viscosity.

Thus, although salt-instability of starch is relatively well understood, the problem remains, starches currently used in the food-industry generally have low-stability to salts compromising at least the palatibility, texture, appearance and other related aspects of foodstuffs.

The invention provides modified starch, and derivatives derived thereof, having improved salt-stability (salt-stable starch), use of such modified starch or derivatives derived from said starch in foodstuff, a method for providing salt-stability to foodstuff comprising use of such modified starch or derivatives derived from said starch and foodstuff comprising said modified starch or derivatives derived from said starch.

The invention provides a method for improving a foodstuff comprising adding to said foodstuff a salt-stable starch. Such a starch has improved stability to salts and other components that are detrimental to the stability of a common starch. The invention for example provides a method for improving the texture of a foodstuff, e.g. the cohesiveness of relatively solid foods such as meats or meat products or puddings or the smoothness of relatively liquid products such as soups, sauces, creams or fillings. The invention provides a method wherein said salt-stable starch is a non-cereal starch, for example derived from tubers or roots, containing essentially only amylopectin molecules.

The invention provides a method for providing a foodstuff with a desired texture comprising adding to said foodstuff a modified starch obtained from for example tubers or roots, said starch containing essentially only amylopectin molecules. A modified starch is a native starch treated in such a way as to modify one or more of its physical or chemical properties. Modified starches have remained their starch character. The native or raw starches are modified to produce starch products with desirable properties. Starches, both of the common variety containing both amylose and amylopectin, obtained from both cereals and tubers or roots and of the waxy variety, containing essentially only amylopectin molecules (e.g. 0-5% amylose), obtained from cereals, are widely used in foodstuff.

Common starch consists of two major components, an, in essence, linear $\alpha(1-4)$ D-glucan polymer (branching is found at a low level) and an elaborately branched $\alpha(1-4$ and $1-6)$ D-glucan polymer, called amylose and amylopectin, respectively.

5 Amylose has, in solution, a helical conformation with a molecular weight of $10^4 - 10^5$. Amylopectin consists of short chains of α -D-glucopyranose units primarily linked by (1-4) bonds with (1-6) branches and with a molecular weight of up to 10^7 .

10 Amylose/amylopectin ratios in native starches in plants are generally anywhere at 10-40 amylose/90-60% amylopectin, also depending on the variety of plant studied. In a number of plant species mutants are known which deviate significantly from the above mentioned percentages. These
15 mutants have long been known in maize (corn) and some other cereals. Waxy corn or waxy maize has been studied since the beginning of this century. Therefore, the term waxy starch has often been equated with amylose free starch, despite the fact that such starch was in general not known from other
20 starch sources such as potato but mainly derived from corn. Furthermore, industrial use of an amylose free potato starch has never occurred on a large scale and with such a wide range of applications as waxy starch. The invention provides a method according to the invention wherein said starch has
25 superior salt-stability over a common starch. For example, the invention provides a modified cross-linked starch having superior stability over a common starch when tested in a sodium chloride solution, or when tested in a solution containing calcium ions, which seriously effect the viscosity
30 of a common potato starch. Furthermore, the invention provides a cross-linked starch which has superior salt-stability, even at low viscosity, and it's use is thus not dependent on high-viscosity conditions as for example utilised in EP 0796868. Another example of the invention is a
35 modified starch according to the invention which provides a

meat brine, a foodstuff used in preparing meat products, with increased and more stable water binding properties than a common starch would do. Also, the addition of a milk protein, such as caseine which has viscosity inhibiting properties, or
5 derivative thereof to a foodstuff no longer compromises the texture of said foodstuff when a modified starch according to the invention is added to said foodstuff.

The invention provides a method wherein said modified starch containing essentially only amylopectine molecules has
10 been derived from a genetically modified plant. Amylose production in a plant is among others regulated by the enzyme granule-bound starch synthase (GBSS), which is involved in generating the amylose content of starch, and it has been found that many of the waxy cereal mutants described above
15 lack this enzyme or its activity, thereby causing the exclusive amylopectin character of these mutants.

An example of a salt-stable starch provided by the invention is a starch obtained from an amylose-free potato plant which is for example lacking GBSS activity or GBSS
20 protein altogether, thereby lacking amylose and having essentially only amylopectin molecules.

In a preferred embodiment of the invention, a method is provided wherein the starch is derived from a genetically modified plant such as a potato, yam, manihot or cassave.
25 Genetic modification of such tuber or root plants is a skill available to the artisan, and for example involves modification, deletion of or insertion in or (antisense) reversion of (parts of) a gene, such as a gene encoding granule-bound starch synthase (GBSS), which is involved in
30 determining the amylose content of starch. In order to manipulate such crop plants, efficient transformation systems and isolated genes are available, especially of potato, and others are found by analogy. Traits, such as absence of amylose, that are introduced in one variety of a crop plant

can easily be introduced into another variety by cross-breeding.

In the experimental part of this description, a method is provided wherein said modified starch is obtained from a
5 genetically modified potato.

In a preferred embodiment, a method and a modified starch are provided wherein said starch is a crosslinked starch. Crosslinking starch is in itself a method available to the artisan, various cross-linking agents are known,
10 examples are epichlorohydrin, sodium trimetaphosphate, phosphorous oxychloride, chloroacetic acid, acrolein, dichloro acetic acid, adipic anhydride or other reagents with two or more anhydride, halogen, halohydrin, epoxide or glycidyl groups or combinations thereof which all can be used
15 as crosslinking agents. A typical example of such a cross-linked starch is starch mono-phosphate.

Furthermore, the invention provides a starch which is stabilised. Stabilisation by hydroxyalkylation or carboxymethylation of starch is for example obtained with
20 reagents containing a halogen, halohydrin, epoxide or glycidyl group as reactive site. Chloro acetic acid (or its salt) is used as carboxymethylation reagent. In one embodiment of the invention said starch is stabilised by hydroxypropylation, hydroxybutylation, hydroxyethylation
25 and/or carboxymethylation.

In yet another embodiment of the invention, said starch is a stabilized starch in which some or all of the available hydroxyl groups of the amylopectin molecules have been esterified by acetyl groups. The addition of acetyl groups is
30 generally done in aqueous suspensions of starch using acetic anhydride or vinyl acetate as reactants under alkaline conditions.

A modified starch as provided by the invention is preferably derived from root or tuber-derived amylose-free or
35 amylopectin native starches such as obtainable from potato

starch, tapioca, sweetroot starch, yam starch, canna starch or manihot starch. In a preferred embodiment of the invention such a root or tuber starch is derived from a genetically modified plant, for example from a genetically modified
5 potato plant variety. Examples of such a potato plant variety are the variety Apriori or Apropect, or varieties derived thereof.

In a much preferred embodiment, the invention provides modified starch comprising a starch obtained from tubers or
10 roots, said starch containing essentially only amylopectin molecules, and derivatives derived thereof, having improved salt-stability (salt-stable starch), use of such modified starch or derivatives derived from said starch in foodstuff, a method for providing salt-stability to foodstuff comprising
15 use of such modified starch or derivatives derived from said starch and foodstuff comprising said modified starch or derivatives derived from said starch.

Use of starch from genetically engineered crops has in general been suggested from the time on it was possible to
20 genetically modify such crops (see i.e. Bruinenberg et al., Chemistry and Industry, 6 November 1995, page 881-884; de Vries, Foodmarketing and Technology, April 1997, page 12-13)). Specific use of amylopectin-type potato starch as filling or viscosity agent in canning has been suggested in
25 WO/97/03573 to prevent undesired residual viscosity seen with commonly used starch. Furthermore, EP 0 796 868 suggests use of a hydroxypropylated and highly cross-linked waxy potato starch to increase the viscosity of a food product. However, none of these provide indications on how to avoid using
30 starches in the food-industry which generally have low-stability to salts and compromise at least the palatability, texture, appearance and other related aspects of foodstuffs. To the contrary, for example WO/97/03573 suggests an amylopectin-type potato starch which maintains its viscosity
35 only for a certain period, after which no residual viscosity

is left, suggesting that these types of products are less stable instead, and EP 0 796 868 suggests using said hydroxypropylated and highly cross-linked waxy potato starch under conditions of high temperature, low temperature and
5 high shear, again conditions, such as aseptic filling, retorting or freezing, where fill viscosity may be needed and salt stability is no issue.

In a preferred embodiment, the invention provides a method according to the invention wherein said modified
10 starch is an instant starch. In general starch and starch derivatives for the food industry are insoluble in cold water. Viscosity and water binding is achieved by heating or cooking. These starches are referred to as cook-up starches. For convenience starches are sometimes pregelatinised i.e.
15 precooked and dried. These starches are referred to as instant starches and perform without heating or cooking in the food stuff. Pre-gelatinisation can be achieved by spray cooking, spray drying, roll drying, drum drying, extrusion, heating in aqueous water miscible organic solvents or under
20 high pressure or with other methods known in the art.

Furthermore, the invention provides a method wherein said foodstuff comprises at least 0.1(w/w)%, preferably at least 0.5 or 1(w/w)% or even at least 2-10(w/w)% of a sodium salt or combinations of sodium salts, for example wherein said
25 salt comprises sodium chloride or for example wherein said salt comprises sodium-mono-glutamate (vetsin).

Also, the invention provides a method wherein said foodstuff comprises at least 0.5(w/w)%, preferably at least 1 or 2(w/w)% or even at least 10-20(w/w)% of a milk protein or
30 derivative thereof for example wherein said protein is caseine.

Furthermore, the invention provides a method wherein said foodstuff comprises at least 0.5(w/w)%, preferably at least 1(w/w)% or even at least 3-5(w/w)% of a calcium salt,
35 for example wherein said salt is calcium chloride.

Furthermore, the invention provides a method wherein said foodstuff comprises at least 5(w/w)%, preferably at least 10(w/w)%, more preferably at least 20(w/w)% or even at least 30-70(w/w)% of a sugar, for example wherein said sugar
5 is sucrose.

In the experimental part of this description examples are given of improved foodstuffs according to the invention, wherein various salts, and other components, such as milk protein or sugars, or combinations thereof, are used at
10 various concentrations in combination with a starch according to the invention which provides the desired texture to said foodstuff.

Yet another embodiment of the invention is a method wherein said foodstuff is a meat brine, which is a foodstuff
15 in itself (however in general not intended for primary consumption) and used for example for preparing a meat product. Such a meat brine is in general used to improve the texture of a meat product.

The invention further provides a modified starch for use
20 in a method according to the invention. Examples of such a modified starch are described herein above and in the experimental part of the invention.

Furthermore, the invention provides foodstuff obtainable by a method according to the invention. For example, the
25 invention provides a meat brine comprising a modified starch as provided by the invention.

The invention is further described in the experimental part of the description without limiting the invention thereto.

Experimental part

Example 1

5

Stability of cross-bonded or cross-linked, acetylated regular potato starch (PS), is influenced negatively when applied in salt containing formulations foodstuffs, however, the invention provides products based on amylopectin potato starch (APS) which are more viscosity or water retention stable than regular potato starch derivatives. Especially products that have been developed for meat or meat product applications, such as meat injection brine, used for example for preparing or injecting meats such as ham or poultry products, such as "thanksgiving" turkey. Possible products are regular potato starch derivatives for example crosslinked with sodiumtrimetaphosphate and acetylated with acetic anhydride and are herein compared with amylopectin potato starch (APS) derivatives. APS was crossbonded with the same amount of NaTMP as PS and stabilized with acetic anhydride. The products were characterised on Brabender gelatinisation in demineralised water (as is) and in 1% NaCl solution.

Materials

25

- A - Regular potato starch derivative
- B - Amylopectin potato starch derivative
- C - Regular potato starch derivative
- D - Amylopectin potato starch derivative

30

The crosslinking of A, B, C and D with NaTMP and esterification with acetic anhydride were done according to routine procedures.

- E - Regular potato starch derivative
 F - Amylopectin potato starch derivative

5 The crosslinking of E and F with POCl₃ was done according to routine procedures.

10 The products were characterised by Brabender gelatinization. Gelatinisation was measured of a 3% (dry matter) suspension with a Brabender viscograph, type E at 250 cmg in demineralized water. Gelatinisation behaviour was also measured in a 1% NaCl solution.

15 Table 1 : Brabender gelatinisation, *as is* and in 1% NaCl solution, Brabender type E, 250 cmg, 75 rpm, 3% (dry matter).

Product	Starch	Brabender suspension	T _g °C	T _{peak} °C	BU _{peak}	Brabender BU at °C			
						75°	00'90°	10'90°	20'90°
A	PS	<i>as is</i>	59,5	--	--	795	1405	1825	1915
B	APS	<i>as is</i>	60,5	73,0	3110	2800	2730	2520	2410
A	PS	1% NaCl	61,5	--	--	35	110	155	175
B	APS	1% NaCl	62,0	--	--	940	1010	1080	1095
C	PS	<i>as is</i>	59,5	--	--	805	1335	1710	1800
D	APS	<i>as is</i>	64,5	--	--	1515	1735	1805	1820
C	PS	1% NaCl	61,0	--	--	65	145	200	220
D	APS	1% NaCl	66,0	--	--	125	365	1065	1290

PS = Potato starch, APS = Amylopectin potato starch

20 Viscosity levels in demineralised water of the regular potato starch based products do not differ much. Also it becomes clear that Product D based on APS has the same end viscosity as its potato starch counterpart, but the temperature of gelatinisation is much higher. The product B based on APS has still a peak viscosity. From the table it can be noticed that

the APS based products are more salt stable than the regular PS based products. The end viscosity levels of the samples prepared with potato starch and the APS counterparts do not differ upon gelatinisation in demineralised water. Product B and D. based on amylopectin potato starch provide better stability in the salt solution than the samples prepared with regular potato starch and can therefor be used at lower concentrations.

In table 2, similar effects of POCl_3 cross-linked starch ethers are shown.

Table 2. Brookfield viscosity of the products E and F as is and in 1% NaCl solution Brookfield : RVDV II+ #5, 50 rpm

Product	Starch	Crossl.	Amount per kg	Subst.	DS	Solution	Viscosity mPas
E	PS	POCl_3	19.5 μL	HP	0.15	as is	6150
F	APS	POCl_3	19.5 μL	HP	0.15	as is	4400
E	PS	POCl_3	19.5 μL	HP	0.15	1% NaCl	1960
F	APS	POCl_3	19.5 μL	HP	0.15	1% NaCl	2450

Reduction in viscosity of regular potato starch derivative: 70%

Reduction in viscosity of Amylopectin potato starch: 40%

Viscosity of regular starch derivative in water (as is) is higher than APS derivative. In salt solution the reverse is observed.

Example 2

Viscosity measurement of cross-linked instant starch derivatives in deionized water, 5%(w/w) sodium casein solution and 1%(w/w) CaCl_2 solution

Weight 10 gram of the product. Add 212 ml of the desired solution while the mixture is stirred by hand. Then the mixture is stirred for 1 minute using a Ultra-Turrax at a speed of 4000 rpm. After 29 minutes the dispersion is again stirred by hand for $\frac{1}{2}$ minute and then the viscosity is measured using a Brookfield LVF at 6 rpm with spindle no. 4. Viscosity is determined for increasing degree of cross-linking. For results compare, figures 1, 3, 4.

10

Example 3

Viscosity measurement of instant starch derivatives in the presence of milk powder.

15

Weigh 10 gram product and 28 gram milk powder. Add 212 ml de-ionised water while the mixture is stirred by hand. Then the mixture is stirred for 1 minute using a Ultra-Turrax at a speed of 4000 rpm. After 29 minutes the dispersion is again stirred by hand for $\frac{1}{2}$ minute and then the viscosity is measured using a Brookfield LVF at 6 rpm with spindle no. 4. Viscosity is determined for increasing degree of cross-linking. For results compare, figures 1, 2.

25 Example 4

Water binding

Meat injection brines are injected into whole muscle meats. They provide a desired texture to the meat by dissolving meat proteins that coagulate upon heating. Starch is used to bind water in order to increase the 'pump level' (the amount of water incorporated in the meat product) and texture of the product. They also play a preserving role because of the salt content of the brine. In these experiments water is used to

35

replace meat, in order to get a realistic approximation of the content of the different ingredients. The ingredients of the meat injection brine are as follows:

5	demineralised water	480 g
	salt	8 g
	starch	5.5 g
	dextrose	4 g
	sodium phosphate	2.5 g

10

- The water binding capacity of the brine is measured as follows. The ingredients are mixed and put in a Brabender viskograph. The initial temperature of the Brabender is set on 30°C, the mixture is heated till 75°C with a slope of 1.5°C/min. After staying 5 min at 75°C, the temperature decreases till 25° with a slope of 3°C/min. The mixture is removed from the Brabender and 400 ml is transferred into 2 transparent centrifuge tubes and centrifuged for 15 min at 894 g and 25°C. The separation line between the pellet and the sediment and the supernatant is marked and hereafter the tubes are emptied and dried. Then the tubes are filled with water till the mark; the weight of the water is the sediment volume. The water binding capacity can be expressed in ml sediment per g starch.
- At least two repeats of each starch sample are done. The standard deviation is 5 ml sediment/500 ml on average, which is reasonable compared to a mean of 78 ml sediment/500 ml.

- In Figure 5 the water binding of three cross-bonded hydroxypropylated derivatives is shown. The water binding is expressed in ml per g of starch. Farinex VA 15 is a product based on regular potato starch, HW 3294 is a product based amylopectin potato starch and B 990 is a product based on maize starch. The grey bars on the left are the water binding

capacities in demineralised water, the black bars on the right are the capacities in brine.

As can be seen from the figure, in demineralised water the binding capacity of the products based on potato starch and amylopectin potato starch are about the same. The water
5 binding capacity of the product based on maize starch is much lower.

In brine the binding capacity of the amylopectin based derivative is essentially the same as in water. Only a drop
10 of less than 9 % in the binding capacity is observed. The potato based (30 %) and the corn based products (23 %) show a much larger drop in water binding capacity.

Example 6

15 Viscosity measurements of starch derivatives in the presence of sugar.

It has been found that neutral components like saccharides (sugars) affect the viscosity of starch and derivatives (I,D. Evans, D.R. Haisman, Die staerke 34, 224-231 (1982)). The
20 effects have been contributed to the same phenomena as with salts (water structure).

Example 6 provides the effects on viscosity of using APS derived starch in sugar solutions.

25 Addition of relatively large amounts of sucrose to common starch causes a decrease in viscosity. Quite surprisingly, amylopectin potato starch derivatives show the opposite effect, as is demonstrated in table 3.

Table 3.

Product	Starch	Brab. susp.	TG	Tpeak	Bupeak	Brabender BU at °C		
						75°	00'90°	20'90°
A	PS	as is	59.5	--	--	795	1405	1915
B	APS	as is	0.5	73.0	3110	2800	2730	2410
A	PS	30% suc.	61.5	--		360	920	1320
B	APS	30% suc.	63.0	73	4960	4800	3920	3520

Example 7

Moisture loss of sausages upon refrigerated storage

- 5 Bologna sausages were stored in refrigeration at minus 5.5 degrees Centigrade for a week. The sausages were weighed before and after storage, from this the moisture loss was calculated.

- 10 In the recipe for the sausage 4 types of starch were used:
 - Farinex VA15 a crosslinked, acetylated potato starch (sodium trimetaphosphate, acetic acid anhydride)
 - Amylo VA15 a crosslinked, acetylated amylopectin potato starch (sodium trimetaphosphate, acetic acid anhydride)
- 15 - Perfectabind M10 a crosslinked, hydroxypropylated potato starch (POC13, propylene oxide)
- Amylo M10 a crosslinked, hydroxypropylated amylopectin potato starch (POC13 Propylene oxide)

- 20 Recipe of the Bologna sausage:

Lean beef	44.7%
Fat beef	11.2%
Water	34.4%
Salt	2.0%
- 25 Sodium tripolyphosphate 0.3%
- Sugar 1.7%
- Milwaukee seasoning S79608 2.3%
- Nitrite (150 ppm) 0.14%
- Starch 3.3%

Preperation of the Bologna sausage:

The beef was ground and mixed with water, the ingredients except the starch were added and mixed again, starch was added, mixed again untill a homogeneous mass was obtained. This was emulsified and putt into Bologna sausage casings. Subsequently the sausages were smoked in a smokehouse.

Table 4.

Moisture loss of Bologna sausages after refrigeration for 1 week

Type of starch	moisture loss*
Farinex VA15	2.0%
Amylo VA15	1.5%
Perfectabind M10	3.8%
Amylo M10	1.8%

* These figures are averages of 6 individual sausages per type of starch.

Examples of improved foodstuff according to the invention.

Instant fruit filling

Ingredients:	%	g
Instant modified starch	33.3	15.0
Powdered sugar	66.7	30.0

Preparation procedure:

- the dry ingredients are blended
- the powdered mix (45 g) is added to 200 ml fruit juice and stirred (low speed) for 1 minute.

Instant lemon whipped dessert

	Ingredients:	%
5	Powdered sugar	32.0
	Instant skimmed milk powder	22.2
	Whippable Fat Powder	22.0
	Starch derivative	22.0
	Lemon Flavour	1.0
10	Citric acid	0.5
	Colour	0.3

Use 50 g dry mix to 150 mL of cold water

15 Fat-free bologna

Recipe for fat-free bologna

	Ingredients:	%
20	Lean port (1.2% - 1.5% fat)	28.55
	Lean turkey (0.7% fat)	24.37
	Water	27.30
	Modified starch	7.62
	Dextrose	3.13
25	Salt	2.12
	Milk protein hydrolysate	2.06
	Bologna flavouring/seasoning	1.79
	Sodium lactate	1.25
	Turkey stock (dry)	0.38
30	Sodium tripolyphosphate	0.25
	Cure-all (6.25% of NaNO ₂)	0.12

Low-fat hot dogs

Ingredients:		%
	B90 Lean Beef	39.17
5	B65 Fat Beef	9.36
	Water	1.27
	Salt	2.05
	Sodium Tripolyphosphate (TSP)	0.243
	Sucrose	1.69
10	Beef Frankfurter Seasoning	2.20
	Cure salt (contains 6.25% sodium nitrite)	0.121
	Sodium Erythorbate	0.022
	Ground Mustard	0.58
	Modified starch	3.38
15	Total raw meat mix:	100.0

Vending soup

20	Ingredients:	%	g
	Instant modified starch	2.6	5.5
	Bouillon powder	1.9	4.0
	Water	95.5	200.0

25

Preparation procedure:

- weigh the dry components in a 250 ml beaker
- add hot water and stir

Instant pudding

Ingredients:		%	g
	Instant modified starch	24.2	20.0
5	Powdered sugar	48.5	40.0
	Dextrose monohydrate	24.2	20.0
	Tetrasodium pyrophosphate	2.0	1.8
	Calcium acetate	1.0	0.8
	Colour/vanilla flavour	0.1	0.4

10

Preparation procedure:

- the dry ingredients are blended
- the powdered mix (80 g) is added to 500 ml cold milk and stirred for 1 minute using an electric hand-mixer (high speed)
- pour the pudding into dessert-trays and place them into the refrigerator for 30 minutes

15

Bilberry pie filling

20

Ingredients:		%	g
A	sugar	19.0	47.5
	modified starch	5.4	13.5
	salt	0.2	0.5
25	B bilberry juice	30.0	75.0
	water	45.4	113.5

Total:	100.0	250.0
--------	-------	-------

30 Preparation procedure:

- mix the dry components (mix A)
- mix bilberry juice and water in a pan (mix B)
- add mix A to mix B and suspend with a whisk
- heat until boiling whilst stirring with a whisk
- keep boiling for 1 minute

35

UHT lobster soup

	Ingredients:	%
5	Milk	12.1
	Cream	6.0
	Lobstermix**	5.1
	Lecimulthin 100*	0.02
	Instant modified starch	4.3
10	Water	72.48

* Supplier Lucas Meyer

** Supplier Rieber & Son

15 Processing steps for lobster soup:

- Preheating to 70°C in a PHE
- Homogenisation at 50 bar
- Sterilisation at 135°C
- Holding for 28 seconds
- 20 - Cooling to 20°C in tubes (20 QC heb ik veranderd in °C)
- Filling temperature 20°C

Recipe UHT spicy soup

25	Ingredients:	%
	Salt (NaCl)	0.8
	Butter	0.6
	Tomato paste	12.5
	Instant modified starch	2.0
30	Spice mix	0.8
	Chicken bouillon	0.2
	Lecimulthin 100*	0.03
	Water	83.07

35 * Supplier Lucas Meyer

Processing steps for tomato soup:

- Preheating to 70°C in a PHE
- Homogenisation at 50 bar
- Sterilisation at 135°C
- 5 - Holding for 28 seconds
- Cooling to 20°C in tubes
- Filling temperature 20°C

Instant bakery cream

10	Ingredients:	%	g
	Instant modified starch	20.0	80.0
	Whole milk powder	30.0	120.0
	Powdered sugar	47.5	130.0
	Alginate blend	2.25	20.0
15	Colour/vanilla flavour	0.25	1.0

Preparation procedure:

- the dry ingredients are blended
- the powdered mix (400 g) is added to 1000 ml tap water and
- 20 stirred for 3 minutes using an Hobart mixer (high speed)

Hot dogs and bologna (low fat formulation 15%)

	Meal formulation for	50Lbs
	Ingredients	%
25	B85 Lean Beef	44.740%
	B50 Fat Beef	11.180%
	Water	34.380%
	Salt	2.030%
	Sodium Tripolyphosphate	0.280%
30	Sucrose	1.692%
	Seasoning Milwaukee*	2.280%
	Nitrite (150 PPM)	0.140%
	Sod Erythorbate (550 PPM of	0.000%
	Starch	3.288%
35	Total	99.997%

Figures

5 Figure 1. Viscosity measurement of cross-linked instant starch derivatives in deionized water.

Figure 2. Viscosity measurement of cross-linked instant starch derivatives in a milky solution, here prepared by adding milk powder.

10

Figure 3. Viscosity measurement of cross-linked instant starch derivatives in 1%(w/w) CaCl_2 solution.

15 Figure 4. Viscosity measurement of cross-linked instant starch derivatives in 5%(w/w) sodium casein solution.

Figure 5. Water binding properties of cross-linked hydroxylpropylated starch derivatives in water and in brine.

CLAIMS

1. A method for improving a foodstuff comprising adding to said foodstuff a salt-stable starch.
2. A method according to claim 1 wherein the texture of said foodstuff is improved.
- 5 3. A method according to claim 1 or 2 wherein said starch is a non-cereal starch containing essentially only amylopectin molecules.
4. A method according to any one of claims 1 to 3 wherein said starch is derived from a genetically modified plant.
- 10 5. A method according to claim 4 wherein said plant is a potato.
6. A method according to any one of claims 1 to 5 wherein said starch is a cross-linked starch, such as a phosphorus oxytrichloride or sodium trimetaphosphate cross-linked starch.
- 15 7. A method according to any one of claims 1 to 6 wherein said starch is a stabilised starch, such as a hydroxyalkylated or acetylated starch.
8. A method according to any one of claims 1 to 7 wherein said starch is an instant starch.
- 20 9. A method according to any one of claims 1 to 8 wherein said foodstuff comprises at least 0.1(w/w)%, preferably at least 0.5 (w/w)%, more preferably at least 1 (w/w)% of a sodium salt.
10. A method according to claim 9 wherein said salt is sodium chloride.
- 25 11. A method according to claim 9 wherein said salt is sodium monoglutamate.
12. A method according to any one of claims 1 to 8 wherein said foodstuff comprises at least 0.5(w/w)%, preferably at least 1(w/w)% of a milk protein or derivative thereof.
- 30 13. A method according to claim 12 wherein said protein is caseine.

14. A method according to any one of claims 1 to 8 wherein said foodstuff comprises at least 0.5(w/w)%, preferably at least 1(w/w)% of a calcium salt.
15. A method according to claim 14 wherein said salt is calcium chloride.
16. A method according to any one of claims 1 to 8 wherein said foodstuff comprises at least 5(w/w)%, preferably at least 10(w/w)%, more preferably at least 20(w/w)% of a sugar.
17. A method according to claim 16 wherein said sugar is sucrose.
18. A method according to any one of claims 1 to 17 wherein said foodstuff is a meat brine.
19. A modified starch for use in a method according to any one of claims 1 to 18.
20. A foodstuff obtainable by a method according to any one of claims 1 to 18.

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Figure 1 : Brookfield viscosity in deionized water
Brookfield LVF, 6 rpm, spindle 4

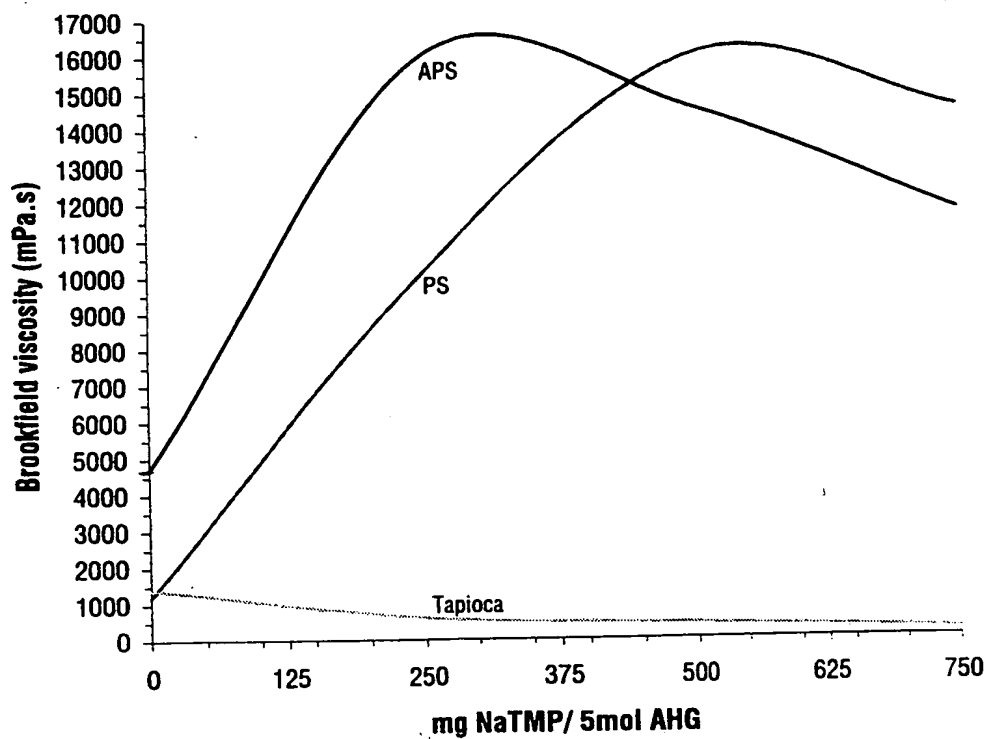
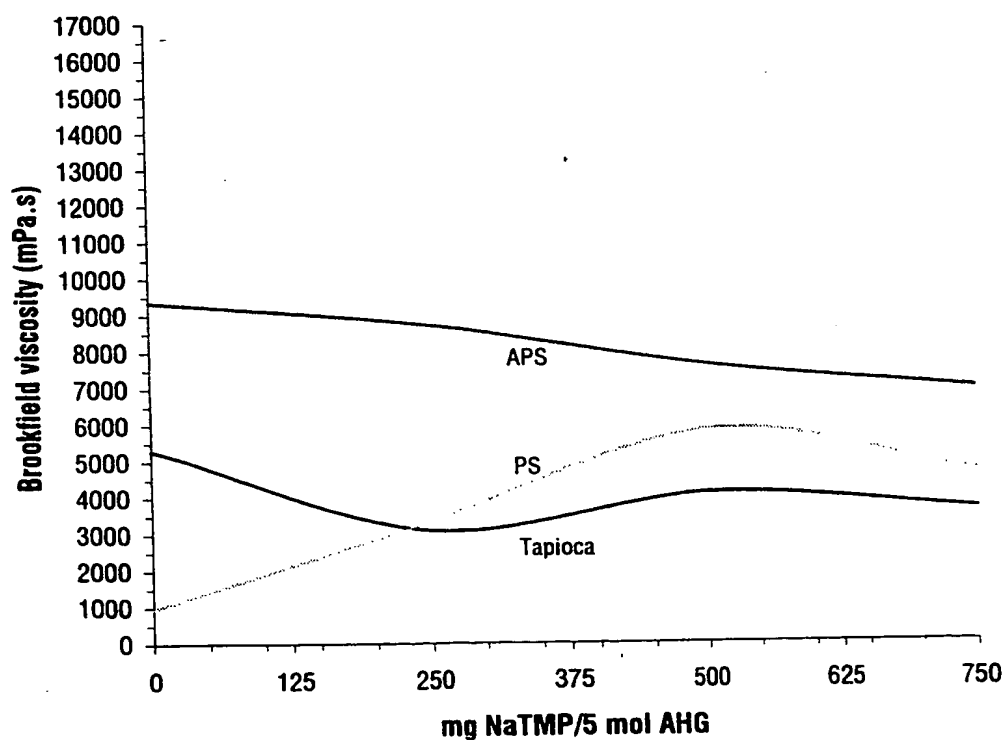


Figure 2 : Brookfield viscosity in milk
Brookfield LVF, 6 rpm, spindle 4



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Figure 3 : Brookfield viscosity in 1% CaCl_2
Brookfield LVF, 6 rpm, spindle 4

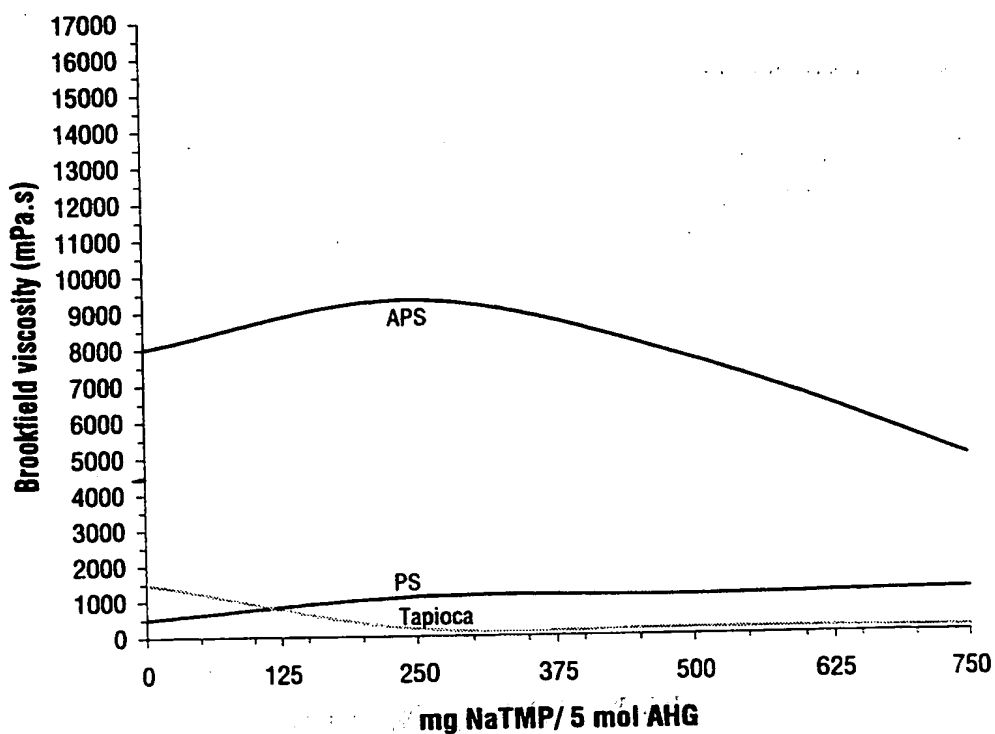
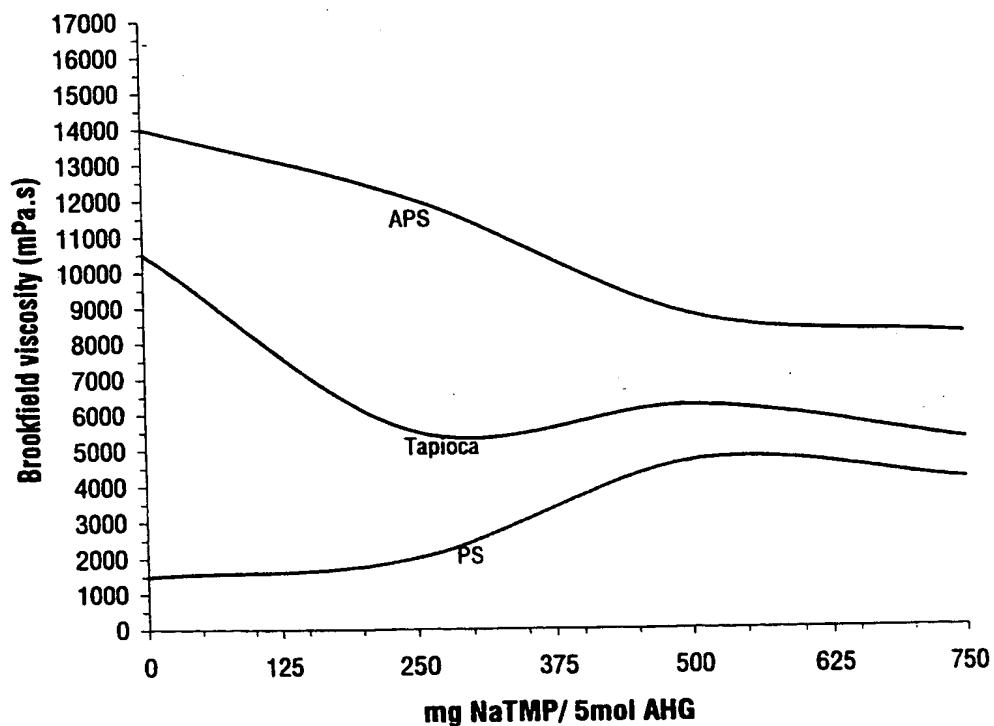
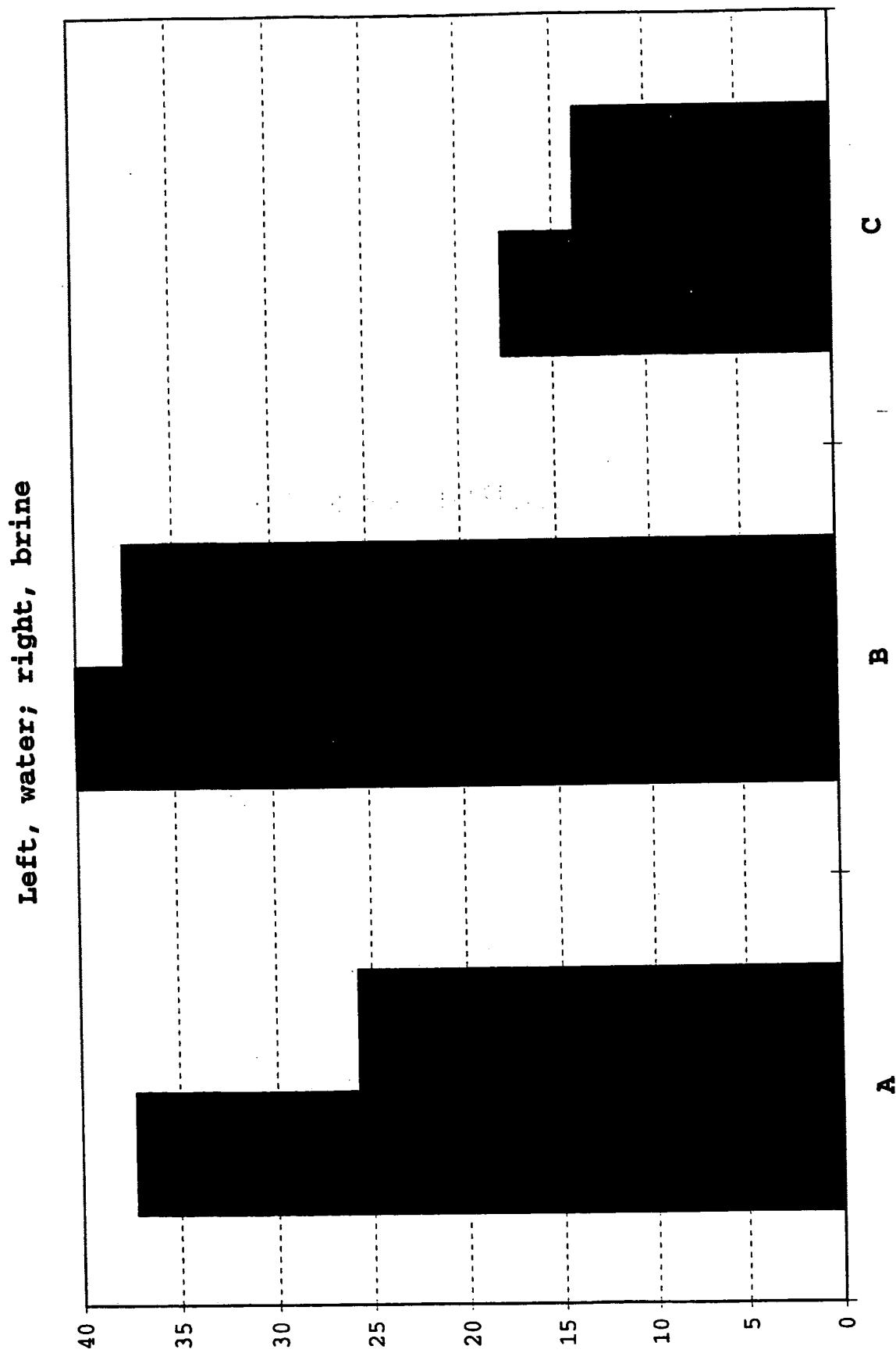


Figure 4 : Brookfield viscosity in 5 % Caseine (Sodium salt)
Brookfield LVF, 6 rpm, spindle 4



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Figur 5



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INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 99/00416

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23L1/0522 A23L1/187 A23L1/068 A23P1/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L A23P A23B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 192 576 A (CHANG SHAU-GAN ET AL) 9 March 1993 (1993-03-09) column 2, line 50 -column 3, line 65 example 4	1-4, 7, 9, 10, 19, 20
X	EP 0 796 868 A (NAT STARCH CHEM INVEST) 24 September 1997 (1997-09-24) cited in the application page 1, line 11 -page 2, line 55; claims examples	1-7, 9, 12, 13, 16, 17, 19, 20
X	WO 97 03573 A (SVERIGES STAERKELSEPRODUCENTER ;STAHL AAKE (SE)) 6 February 1997 (1997-02-06) cited in the application the whole document	1-5, 19, 20
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search

5 October 1999

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